

Amendments to the Specification:

Please delete the paragraph beginning at page 3, line 15, which starts with "Figs. 1A and 1B".

Please replace the paragraph beginning at page 3, line 17, as with the following amended paragraph:

Figs. ~~2A, 2B, and 2C~~ 1A, 1B, and 1C illustrate an embodiment of a method of delivering an embolic composition.

Please replace the paragraph beginning at page 3, line 19, as with the following amended paragraph:

Fig. ~~[[3A]]~~ 2A is an illustration of an embodiment of an embolic particle having a slot; and Fig. ~~[[3B]]~~ 2B is an illustration of two of particles of Fig. ~~[[3A]]~~ 2A interlocking.

Please replace the paragraph beginning at page 3, line 21, as with the following amended paragraph:

Fig. ~~[[4]]~~ 3 is an illustration of an embodiment of an embolic particle having enlarged portions.

Please replace the paragraph beginning at page 3, line 22, as with the following amended paragraph:

Fig. ~~[[5]]~~ 4 is an illustration of an embodiment of an embolic particle having ridges.

Please replace the paragraph beginning at page 3, line 23, as with the following amended paragraph:

Fig. ~~[[6]]~~ 5 is an illustration of an embodiment of an embolic particle having a cross section with vertices.

Please replace the paragraph beginning at page 3, line 25, as with the following amended paragraph:

Fig. ~~[[7]]~~ 6 is an illustration of an embodiment of an embolic particle having a slot.

Please delete the paragraph beginning at page 3, line 26, which starts with "Figs. 8A, 8B, and 8C".

Please replace the paragraph beginning at page 3, line 28, as with the following amended paragraph:

Fig. ~~[[9A]]~~ 7A is an illustration of an embodiment of a ribbon-like embolic particle; and Fig. ~~[[9B]]~~ 7B is an illustration of an embodiment of a sheet-like embolic particle.

Please replace the paragraph beginning at page 3, line 30, as with the following amended paragraph:

Fig. ~~[[10A]]~~ 8A is a top view of an embodiment of an oblate embolic particle; Fig. ~~[[10B]]~~ 8B is a side view of the particle of Fig. ~~[[10A]]~~ 8C; and Fig. ~~[[10C]]~~ 8C shows the particle of Fig. ~~[[10A]]~~ 8A in a flexed position.

Please replace the paragraph beginning at page 4, line 1, as with the following amended paragraph:

Figs. ~~[[11A]]~~ 9A and ~~[[11B]]~~ 9B are illustrations of an embodiment of a star-shaped embolic particle.

Please replace the paragraph beginning at page 4, line 2, as with the following amended paragraph:

Fig. ~~[[12A]]~~ 10A is an illustration of an embodiment of an embolic particle having a slot; Fig. ~~[[12B]]~~ 10B is an illustration of an embodiment of a gear-shaped embolic particle; and Fig. ~~[[12C]]~~ 10C is an illustration of an embodiment of a wedge-shaped embolic particle.

Please replace the paragraph beginning at page 4, line 5, as with the following amended paragraph:

Figs. ~~13A, 13B, and 13C~~ 11A, 11B, and 11C illustrate an embodiment of a method of delivering an embolic composition.

Please replace the paragraph beginning at page 4, line 7, as with the following amended paragraph:

Fig. ~~[[14]]~~ 12 is an illustration of an embodiment of an embolic particle having fibers.

Please replace the paragraph beginning at page 4, line 8, as with the following amended paragraph:

Figs. ~~15A, 15B, 15C, 15D, 15E, and 15F~~ 13A, 13B, 13C, 13D, 13E, and 13F are illustrations of embodiments of embolic particles having various projections.

Please replace the paragraph beginning at page 4, line 10, as with the following amended paragraph:

Fig. ~~[[16]]~~ 14 is an illustration of an embodiment of an embolic particle having a cavity.

Please replace the paragraph beginning at page 4, line 11, as with the following amended paragraph:

Fig. ~~[[17A]]~~ 15A is an illustration of an embodiment of an occlusion; and Fig. ~~[[17B]]~~ 15B is an illustration of two embolic particles interlocking.

Please replace the paragraph beginning at page 4, line 13, as with the following amended paragraph:

Fig. ~~[[18]]~~ 16 is an illustration of an embodiment of an occlusion.

Please replace the paragraph beginning at page 4, line 14, as with the following amended paragraph:

Fig. ~~[[19]]~~ 17 is an illustration of an embodiment of an occlusion.

Please replace the paragraph beginning at page 4, line 15, as with the following amended paragraph:

Fig. ~~[[20]]~~ 18 is an illustration of two embolic particles having complementary features.

Please replace the paragraph beginning at page 4, line 16, as with the following amended paragraph:

Figs. ~~21A and 21B~~ 19A and 19B are illustrations of embodiments of embolic particles having teardrop shapes.

Please replace the paragraph beginning at page 4, line 18, as with the following amended paragraph:

Figs. ~~22A, 22B, and 22C~~ 20A, 20B, and 20C are illustrations of embodiments of occlusions.

Please replace the paragraph beginning at page 4, line 19, as with the following amended paragraph:

Fig. ~~[[23A]]~~ 21A is an illustration of an embodiment of a catheter; and Fig. ~~[[23B]]~~ 21B is a cross-sectional view of the catheter of Fig. ~~[[23A]]~~ 21A, taken along line ~~23B-23B~~ 21B-21B.

Please replace the paragraph beginning at page 4, line 21, as with the following amended paragraph:

Fig. ~~[[24A]]~~ 22A is an illustration of an embodiment of a catheter; and Fig. ~~[[24B]]~~ 22A is a cross-sectional view of the catheter of Fig. ~~[[24A]]~~ 22A, taken along line ~~24B-24B~~ 22B-22B.

Please replace the paragraph beginning at page 4, line 25, as with the following amended paragraph:

~~Referring to Figs. 1A and 1B, an~~ An embolic composition 22 includes a collection of particles 28. ~~Particles 28~~ The particles may be contained in a vessel 23 with a suitable carrier 25, such as saline, prior to use. ~~Referring particularly to Fig. 1A, particles 28~~ The particles are in a first state in which the particles have a common shape, such as a compacted, generally spherical shape. ~~Referring to Fig. 1B, particles 28 are illustrated~~ The particles can be in a second state in which the particles have a less compacted shape. The transition between the states, and the shape change of the particles, can be selectively triggered to facilitate treatment, e.g., embolization.

Please replace the paragraph beginning at page 5, line 1, as with the following amended paragraph:

~~Composition~~ Referring to Figs. 1A-1C, a composition 22 can be delivered to a target site 24 in a vessel 26 using a catheter 30. ~~Referring to Figs. 2A-2C, during~~ During delivery through catheter 30, the particles 28 are in the first state and have a compacted shape that provides flowability to avoid clogging or aggregation in catheter 30. After particles 28 are released from catheter 30, the particles are transitioned to the second state to form a second shape, such as an enlarged, non-compacted shape. Particles 28, in their second shape, then flow within vessel 26, aggregate, and block the vessel, thereby depriving a tumor or reducing hemorrhaging, for example.

Please replace the paragraph beginning at page 7, line 30, as with the following amended paragraph:

In some embodiments, embolic particle 28 has an elongated shape, as exemplified by the embodiments shown in Figs. ~~3A~~ 2A and ~~4-7~~ 3-6. That is, particle 28 has a length, L, that is greater than a width or diameter, W. The length, L, is the longest dimension of particle 28, and can range from about 100 microns to about 1200 microns. For example, the length, L, can be

greater than or equal to about 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, or 1100 microns; and/or less than or equal to about 1200, 1100, 1000, 900, 800, 700, 600, 500, 400, 300, or 200 microns. The width or diameter, W, is the average dimension taken along a plane transverse (e.g., orthogonal) to the direction of length, L. The width or diameter, W, can range from about 50 microns to about 1000 microns. For example, W can be greater than or equal to about 50, 100, 200, 300, 400, 500, 600, 700, 800, or 900 microns; and/or less than about 1000, 900, 800, 700, 600, 500, 400, 300, 200, or 100 microns. In some cases, the largest dimension of the particle is equal to or less than the smallest dimension of the instrument (e.g., microcatheter) used to deliver the particles.

Please replace the paragraph beginning at page 8, line 18, as with the following amended paragraph:

As shown in Figs. ~~3A~~ 2A and ~~4-7~~ 3-6, an elongated particle 28 can have different shapes. For example, Figs. ~~3A, 4 and 5~~ 2A, 3 and 4 show different embodiments of elongated particles having a generally tubular shape. Fig. ~~3A~~ 2A shows an embolic particle 32 in the shape of a cylinder having a slot or a groove 34 extending along the length of the particle. Slot 34 allows particle 32 to be more easily compacted, e.g., for delivery, and facilitates interaction between the particles, e.g., by allowing the slots to engage (e.g., interlock) with each other and the particles to self-assemble (Fig. ~~3B~~ 2B). Slot 34 can extend the entire length of particle 32, or only a portion thereof. Particle 32 can include multiple slots 34, for example, the slots can be arranged collinearly along the particle, and/or distributed (symmetrically or asymmetrically) around the circumference of the particle. In some embodiments, particle 32 does not include slot 34, i.e., the particle can be a conventional cylinder.

Please replace the paragraph beginning at page 8, line 29, as with the following amended paragraph:

Fig. ~~[[4]]~~ 3 shows an embolic particle 36 in the shape of a cylinder having enlarged portions 38. In use, enlarged portions 38 help particles 36 to engage or mate with each other,

thereby enhancing aggregation, e.g., by providing a more closely-packed mass. Portions 38 are generally curvilinear or rounded portions having a diameter greater than the diameter of other portions of particle 36. In some embodiments, enlarged portions 38 have a maximum diameter of about 1,500 microns (e.g., less than about 1,200, 1,000, 800, 600, or 400 microns). Particle 36 can include one or more enlarged portions 38.

Please replace the paragraph beginning at page 9, line 5, as with the following amended paragraph:

Fig. ~~[[5]]~~ 4 shows an embolic particle 40 in the shape of cylinder having a plurality of ridges 42 extending along the length of the particle. As with slot 34 and enlarged portions 38, ridges 42 can help particles 40 engage or lock with each other during use. Ridges 42 can extend the entire length of particle 40, or only a portion thereof. Ridges 42 can be symmetrically or asymmetrically formed about the circumference of particle 40. In some embodiments, ridges 42 have a maximum height, H, of about 100 microns (e.g., less than about 100, 80, 60, or 40 microns), and a base width, X, of about 50 microns. Ridges 42 can have different cross-sectional shapes, such as square, rectangular, or triangular.

Please replace the paragraph beginning at page 9, line 13, as with the following amended paragraph:

Indeed, as shown in Figs. ~~3A and 4-7~~ 2A and 3-6, the embolic particles can have a variety of cross-sectional shapes. For example, Figs. ~~3A~~ 2A and ~~[[4]]~~ 3 show particles 32 and 36 having generally circular cross sections. Fig. ~~[[5]]~~ 4 shows particle 40 having a generally gear-shaped cross section. Fig. ~~[[6]]~~ 5 shows a star-shaped embolic particle 44 having a cross section with multiple (as shown, eight) vertices 46. In some embodiments, particle 44 can have one, two, three, four, five, six, seven, or more vertices 46, arranged symmetrically or asymmetrically around the particle. As another example, Fig. ~~[[7]]~~ 6 shows an embolic particle 48 having a triangular cross section and a slot 50. Particle 48 further illustrates that the embolic particles can have uniform or non-uniform thickness, i.e., the particles can change dimensions, e.g., taper,

along a particular direction. Particle 48, along with particles 40 and 44, also illustrate that the outer surface of the particles can be faceted, vis-à-vis cylindrical or rod-like (e.g., Fig. [[3A]] 2A). In other embodiments, the embolic particles can have other cross sectional shapes, for example, other non-circular shapes, such as oval, elliptical, or regularly or irregularly polygonal having 3, 4, 5, 6, 7, or 8 or more sides.

Please replace the paragraph beginning at page 9, line 27, as with the following amended paragraph:

The embolic particles shown in Figs. ~~3A and 4-7~~ 2A and 3-6 also exemplify a class of embolic particles that can be characterized as having an element of symmetry. In comparison, a mass having a random shape typically does not include an element of symmetry. An example of an element of symmetry is a mirror plane, in which the structure of the particle is identical at corresponding, mirror-imaged locations on both sides of the plane. For example, particles 32 and 48 have a mirror plane (m) extending through the middle of slots 34 and 50, respectively (Figs. ~~3A and 7~~ 2A and 6). Particle 36 has an infinite number of mirror planes extending along the length of the particle and intersecting the cross-sectional center, C (Fig. [[4]] 3). Particle 44 has numerous mirror planes, for example, extending along the length of the particle and intersecting the middle of a vertex 46, respectively (Fig. [[6]] 5). Another example of an element of symmetry is an axis of symmetry about which rotation at selected (but not 360°) intervals yields the identical orientation. For example, particle 36 has an axis of symmetry, R, extending through the cross-sectional center about which rotation in any increment would yield the identical orientation (Fig. [[4]] 3). Particle 44 also has an axis of symmetry, R, extending through the cross-sectional center about which rotation in 45° increments would yield the identical orientation (Fig. [[6]] 5). Particles 32 and 48 have an axis of symmetry, R, about which rotation in 180 degrees increments would yield the identical orientation.

Please replace the paragraph beginning at page 10, line 20, as with the following amended paragraph:



In other embodiments, the elongated particles can be formed to transition to a less elongated shape. ~~Referring to Figs. 8A, 8B, and 8C, particles 67~~ Particles can be delivered through catheter 30 in a first, generally elongated form, such as a cylindrical or fiber-like form. After the particles 67 are released, the particles are exposed to a stimulus that causes the particles to change shape. For example, the particles 67 can change to spring-like coils, three-dimensional masses (such as balls), kinks, and/or zigzag members. The transitioned particles 67 can become entangled with each other to provide an effective occlusion 69. ~~Particles 67~~ The particles can have any of the features described herein (e.g., ridges, projections, and/or slots), in any combination. ~~Particles 67~~ The particles can be used with any of the particles described herein.

Please replace the paragraph beginning at page 10, line 29, as with the following amended paragraph:

The particles are also not limited to the relatively three-dimensional structures shown in Figs. ~~3A and 4-7~~ 2A and 3-6. In some embodiments, the embolic particles can be relatively two-dimensional. That is, the embolic particles can have a very small thickness. Referring to Figs. ~~9A and 9B~~ 7A and 7B, in some cases, the particles are ribbon-like (particle 71) or sheet-like (particle 73). The flat morphology of the particles allows them to be initially compacted (e.g., folded) to facilitate delivery, and subsequently expanded (e.g., unfolded) upon exposure to a stimulus. In some embodiments, particles 71 or 73 have a thickness (T) less than about 50 microns (e.g., less than about 40, 30, or 20 microns). Alternatively or in addition, particles 71 or 73 have a thickness (T) to width (W) ratio of between about 1.25:1 and about 10:1. For example, the aspect ratio can be greater than or equal to about 1.25:1, 2:1, 3:1, 4:1, 5:1, 6:1, 7:1, 8:1, or 9:1; and/or less than or equal to about 10:1, 9:1, 8:1, 7:1, 6:1, 5:1, 4:1, 3:1, or 2:1. The length (L) of particles 71 and 73 can be as described above.

Please replace the paragraph beginning at page 11, line 10, as with the following amended paragraph:

The shape memory material can be used to form embolic particles other than those described above. For example, the shape memory material can also be used to form embolic particles that are not substantially elongated. The shape memory material can be used to form generally spherical (e.g., completely spherical or egg-shaped) embolic particles (e.g., particles 56 and 58 shown in Figs. ~~14 and 15A-15F~~ 12 and 13A-13F, described below). For delivery, the generally spherical particles can be compacted to a generally oblate shape. Subsequently, the particles can be exposed to a stimulus that enlarges the particles, e.g., to the egg-shaped or spherical particles. Suitable dimensions for spherical embolic particles range from about 1,500 microns to about \_\_\_\_ microns in diameter, and are described in U.S.S.N. 09/519,263, filed March 6, 2000, hereby incorporated by reference.

Please replace the paragraph beginning at page 11, line 20, as with the following amended paragraph:

In other embodiments, the shape memory material can be used to form particles whose final form is oblate, e.g., like a red blood cell. Referring to Figs. ~~10A-10B~~ 8A-8C, an oblate particle 52 has a generally round or oval cross section and a relatively flat profile. The surface of particle 52 is generally curvilinear. At its central portion 53, the particle is depressed, such that the central portion is narrowed, and the perimeter 55 of the particle is thicker than the central portion. As a result, particle 52 is concave at central portion 53, and convex at its perimeter 55. The oblate shape allows particle 52 to easily flex (Fig. ~~[[10C]]~~ 8C) so that the particle can be easily delivered, e.g., flow through a catheter without aggregating. In some embodiments, particle 52 can have a width (W) of about 50 to about 1200 microns (e.g., greater than or equal to about 50, 200, 400, 600, 800, or 1000 microns; and/or less than or equal to about 1200, 1000, 800, 600, 400, or 200 microns), a maximum thickness ( $T_{\max}$ ) of about 1000 to about 1200 microns (e.g., greater than or equal to about 1000 or 1100 microns; and/or less than or equal to about 1200 or 1100), and a minimum thickness ( $T_{\min}$ ) of about 100 to about 200 microns (e.g., greater than or equal to about 100 or 150 microns; and/or less than or equal to about 200 or 150

microns). In other embodiments, central portion 53 is not depressed, e.g., the thickness of the oblate particle is generally constant.

Please replace the paragraph beginning at page 12, line 5, as with the following amended paragraph:

Still other relatively non-elongated forms are possible. Figs. ~~11A and 11B~~ 9A and 9B show a non-elongated embolic particle 54 having the generally star-shaped cross-section of particle 44, but without the extended length. The relatively short length can be less than about 100 microns (e.g., less than about 90, 80, 70, 60, 50, 40, 30, 20, or 10 microns). The cross-sectional shape of particle 54 can be modified similarly to the cross-sectional shape of particle 44. Similarly, particles 32, 40, and 48 (Figs. ~~3A, 5, and 7~~ 2A, 4, and 6) can be formed having the same cross-sections but without the extend lengths. Figs. ~~12A, 12B, and 11C~~ 10A, 10B, and 10C respectively show truncated embodiments of particle 32, particle 40, and particle 48 (without a slot).

Please replace the paragraph beginning at page 12, line 13, as with the following amended paragraph:

While the particles described herein can compose an embolic composition having a plurality of particles, in certain embodiments, the embolic composition includes only one particle. Referring to Figs. ~~13A-13C~~ 11A-11C, an embolic particle 120 (as shown, an elongated cylindrical particle) can be delivered to target site 24 in vessel 26 using catheter 30. During delivery, particle 120 is in a first state (e.g., a compacted state) as it passes through catheter 30. After particle 120 is released from catheter 30, the particle is transformed to a second state (e.g., an expanded state), and in the second state, the particle travels through vessel 26 and occludes the vessel. In some embodiments, smaller particles (e.g., as described herein) can be introduced before and/or after particle 120 is delivered to provide additional occlusion. Specific dimensions of particle 120 can be a function of the vessel in which the particle is to be used. In some embodiments, particle 120 has a final, average cross sectional diameter of about one millimeter

to about forty-six millimeters. The length of particle 120 can be about one micron to about 50 mm, e.g., between about 3 and about 25 mm. Particle 120 can be formed into any of the shapes described herein using the material(s) described herein.

Please replace the paragraph beginning at page 12, line 27, as with the following amended paragraph:

In some embodiments, the particles (e.g., the particles shown in Figs. ~~3A and 4-12C~~ 2A and 3-10C) can be formed entirely of a material that does not exhibit shape memory characteristics ("a non-shape memory material"). The performance of the particles can be enhanced by the particular set shape or shapes described above. An example of a suitable non-shape memory material is a biocompatible polymer, such as polyvinyl alcohol (PVA) described in U.S.S.N. 10/215,594, filed August 9, 2002, hereby incorporated by reference. Other suitable materials include biocompatible ceramics, such as silica particles, described in U.S. Patent No. 4,640,807 and EPO 067459, hereby incorporated by reference.

Please replace the paragraph beginning at page 13, line 15, as with the following amended paragraph:

In other embodiments, the embolic particles can be formed of a combination of a shape memory material and a non-shape memory material. For example, referring to Fig. ~~[[14]]~~ 12, particle 56 can include a generally spherical body 60 made of a non-shape memory material, and a plurality of fibers or filaments 62 made of a shape memory material extending from the surface of the body. In some cases, fibers 62 are formed such that the fibers have a free end exposed (as shown in Fig. ~~[[14]]~~ 12); in other cases, the ends of the fibers are embedded in body 60 such that the fibers form a loop extending from the body. Since fibers 62 are made of a shape memory material, particle 56 can be compacted by folding the fibers to body 60 during delivery of the embolic composition, thereby enhancing delivery. Subsequently, fibers 62 can be unfolded in the body so that particles 56 can interact (e.g., tangle) with other and aggregate. In other embodiments, body 60 includes a shape memory material and fibers 62 include a non-shape

memory material. The non-shape memory material can be as described above and can further include synthetic materials, such as polyester, nylon, DACRON®, PTFE, polypropylene, Kevlar®, natural materials, such as silk, collagen, or hair; alginate; or suture-based materials. Particle 56 can be formed wholly of a shape memory material or a non-shape memory material.

Please replace the paragraph beginning at page 13, line 30, as with the following amended paragraph:

As another example, referring to Fig. ~~[[15A]]~~ 13A, particle 58 includes a generally spherical body 64 and a plurality of spikes 66 (not drawn to scale) extending from the body. Body 64 can be formed of a non-shape memory material, and spikes 66 can be formed of a shape memory material. Like fibers 62, during use, spikes 66 can be folded and subsequently unfolded. Spikes 66 can have a length of about 100 microns. In other embodiments, body 64 is formed of a shape memory material, and spikes 66 are formed of a non-shape memory material. Particle 58 can be formed wholly of a shape memory material or a non-shape memory material. In other embodiments, projections other than spikes 66 can be used. For example, the projections can include rods 121 (Fig. ~~[[15B]]~~ 13B), frustoconical projections 123 (Fig. ~~[[15C]]~~ 13C), or bumps 125 (Fig. ~~[[15D]]~~ 13D). The projections can be evenly or unevenly distributed about a particle. The projections can be formed, wholly or in selected portions, of any of the embodiments of particles described herein, such as particles 32, 36, 40, 44, 48, or 120 (Fig. ~~[[15E]]~~ 13E). Different types of projections (e.g., rods and bumps), in any combination, can be formed on a particle (e.g., Fig. ~~[[15F]]~~ 13F).

Please replace the paragraph beginning at page 17, line 22, as with the following amended paragraph:

In other embodiments, referring to Fig. ~~[[16]]~~ 14, an embolic particle 70 can be formed to define a cavity 72 in which a therapeutic agent can be placed and sealed. Cavity 72 can be sealed with a material that degrades or dissolves upon exposure to a predetermined condition, such as contact with bodily fluids, a change in pH, or a change in energy (e.g., temperature).

When the sealant degrades or dissolves, the therapeutic agent can be released in the body. Suitable materials for sealing cavity 72 include polyvinyl pyrrolidone (PVP) (which dissolves in a solution having a selected pH, e.g., about >7.4), polyvinyl acetates, vinyl or collagen based glues or gelatins, and other degradable materials described in Buscemi et al., U.S. Patent No. 5,443,495, hereby incorporated by reference.

Please replace the paragraph beginning at page 18, line 6, as with the following amended paragraph:

Mixtures or combinations of different embolic particles can be introduced (simultaneously or sequentially) during an embolization procedure so that the particles can interact synergistically. Differently shaped particles can be used together. For example, referring to Fig. ~~[[17A]]~~ 15A, three-dimensional particles 41, such as spheres and/or cylinders, can be introduced (before, after, or simultaneously) with two-dimensional particles 43, such as elongated, ribbon-like particles or flat particles. When the particles interact and aggregate, the ribbons or flat particles can fill the voids between the spheres, thereby providing a more effective occlusion. As another example, referring to Fig. ~~[[17B]]~~ 15B, ribbon-like particles 43 can be delivered with particles 45 having slots. The ribbon-like particles can interact (e.g., engage with or interlock with) the slots, thereby self-assembling to a more solid structure.

Please replace the paragraph beginning at page 18, line 16, as with the following amended paragraph:

Alternatively or in addition, particles of different sizes can be used together (e.g., sequentially or simultaneously). Referring to Fig. ~~[[18]]~~ 16, relatively large particles 47 can be used to provide the general structure of an occlusion, while the smaller particles 49 can occupy the spaces between the large particles. The large and small particles can be delivered simultaneously or sequentially. For example, relatively large particles can be delivered first to form the general structure an occlusion, and relative small particles can subsequently be delivered to fill any spaces between the large particles.

Please replace the paragraph beginning at page 18, line 23, as with the following amended paragraph:

Other combinations including particles with complementary (e.g., interlocking) shapes are possible. For example, referring to Fig. ~~[[19]]~~ 17, spherical particles 41 can be delivered with particles 51 having concave portions (e.g., oblate particles 52 described below) that receive portions of the spherical particles. Particles 51 are capable of filling voids between spherical particles 41. Other complementary particles capable of interlocking include particles 53 with openings 55, and particles 57 having a portion 59 (e.g., a projection) capable of penetrating the opening (Fig. ~~[[20]]~~ 18). Other complementary particles 61 include those with teardrop shapes (Figs. ~~21A and 21B~~ 19A and 19B) having a relatively small portion that extends curvilinearly to a relatively large portion. The particles can form relatively flat, two-dimensional structures, or three-dimensional structures (e.g., two particles can engage to form a sphere). In other embodiments, complementary particles have one or more surfaces that are relatively flat, i.e., planar. For example, the particles can be cubic or icosahedral particles. Referring to Figs. ~~22A, 22B, and 22C~~ 20A, 20B, and 20C, particles having flat surfaces can form occlusions by stacking like blocks in which the flat surfaces contact each other. The particles can be of similar or same size (e.g., ~~Fig. 22B and 22C~~ Figs 20B and 20C) or different size (e.g., Fig. ~~[[22A]]~~ 20A).

Please replace the paragraph beginning at page 20, line 23, as with the following amended paragraph:

Mixtures of embolic particles can be delivered using a multi-lumen catheter and/or syringe. For example, referring to Figs. ~~23A and 23B~~ 21A and 21B, a catheter 101 includes two lumens 103 and 105 separated by a wall 107. Wall 107 terminates proximally of the distal tip 109 of catheter 101, so at the distal tip, the catheter has a mixing chamber 111. During use, one type of embolic particles can be delivered through lumen 103, and another type of embolic particles can be delivered through lumen 105. Lumens 103 and 105 keep the particles separated so that, for example, they do not prematurely interact (e.g., aggregate or clog) inside catheter

101. The particles can then mix in chamber 111 before they are introduced into the body. In other embodiments, wall 107 terminates at distal tip 109, i.e., the catheter does not include a mixing chamber. Lumens 103 and 105 can be formed coaxially (Figs. ~~24A and 24B~~ 22A and 22B), vis-à-vis, side-by-side, with or without a mixing chamber. The multi-lumen catheter or syringe can include more than two lumens, depending, for example, on the number of types of embolic particles to be delivered.